

Application No.: 10/643,790

Docket No.: JCLA10858-R

**In The Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

Claim 1. (currently amended) A voltage controlled oscillator (VCO) device, suitable for use in a frequency shift keying (FSK) system, the VCO device comprising:

a switching varactor unit, having a first terminal and a second terminal, wherein the switching varactor unit has at least a first diode and a second diode, the positive ends of the first diode and the second diode are commonly coupled to a node, and the node receives a frequency-selection voltage, such that the switching varactor unit produces a capacitance[[,]] according to [[a]] the frequency-selection voltage; and

a VCO core, having a first output terminal, a second output terminal complementary to the first output terminal, and an input terminal, wherein the switching varactor unit is coupled in parallel with the VCO core at the first output terminal and the second output terminal to produce a capacitance effect with respect to the capacitance, so as to adjust a frequency constant  $\sqrt{LC}$  of the VCO core.

Claim 2. (currently amended) The VCO device of claim 1, wherein the switching varactor unit comprises a switching diode unit for receiving a mode selection signal with at least one bit data, wherein the switching diode unit includes:

a plurality of diode pairs coupled in parallel, wherein the diode pairs can be switched on with respect to a quantity of the mode selection signal, so as to produce the capacitance, wherein

Application No.: 10/643,790

Docket No.: JCLA10858-R

the diode pair has one common terminal coupled to the node frequency-selection voltage and another terminals coupled to the first terminal and the second terminal, respectively.

Claim 3. (currently amended) A frequency shift keying (FSK) system, for outputting a desired frequency, the FSK system comprising:

a frequency selection unit, for receiving an input signal and a mode selection signal, and exporting a frequency-selection voltage according to the mode selection signal;

a switching varactor unit, having a first terminal and a second terminal, wherein the switching varactor unit has at least a first diode and a second diode, the positive ends of the first diode and the second diode are commonly coupled to a node, and the node receives the frequency-selection voltage, such that the switching varactor unit produces a capacitance[[,]] according to [[a]] the frequency-selection voltage; and

a VCO core, having a first output terminal, a second output terminal complementary to the first output terminal, and an input terminal, wherein the switching varactor unit is coupled in parallel with the VCO core at the first output terminal and the second output terminal to produce a capacitance effect with respect to the capacitance, so as to adjust a frequency constant  $\sqrt{LC}$  of the VCO core;

a first VCO buffer, coupled to the first output terminal of the VCO core and exporting a desired frequency;

a second VCO buffer, coupled to the second output terminal of the VCO core; and

a phase locked loop unit, coupled between an output of the second VCO buffer and the

Application No.: 10/643,790

Docket No.: JCLA10858-R

input terminal of the VCO core to form a feedback loop and produce the desired frequency.

Claim 4. (currently amended) The FSK system of claim 3, wherein the switching varactor unit comprises a switching diode unit for receiving the mode selection signal, wherein the switching diode unit includes:

a plurality of diode pairs coupled in parallel, wherein the diode pairs can be switched on with respect to a quantity of the mode selection signal, so as to produce the capacitance, wherein diodes of each diode pair have a common terminal coupled to the node frequency-selection voltage and another terminals coupled to the first terminal and the second terminal, respectively.

Claim 5. (original) The FSK system of claim 4, wherein the diode pairs comprise bipolar junction varactor diode or metal-oxide semiconductor (MOS) varactor diode.

Claim 6. (original) The FSK system of claim 4, wherein each diode of the diode pairs also coupled with a switching device controlled by the mode selection signal.

Claim 7. (currently amended) The FSK system of claim 6, wherein the switching varactor unit further comprises a decoder to decode the mode selection signal into a plurality of channels with respect to the diode pairs for use in-controlling the switching device, so whether each of diode pairs outputting their capacitance or not is controlled by the channels respectively.

Claim 8. (currently amended) A method to adjust an operation frequency of a voltage controlled oscillator (VCO) core, comprising

Application No.: 10/643,790

Docket No.: JCLA10858-R

providing a voltage controlled oscillator (VCO) core, having an output terminal, a feedback output terminal complementary to the output terminal, and an input terminal, wherein the feedback output terminal and the input terminal form a feedback loop through a phase locked loop unit;

providing a switching varactor unit, for producing a capacitance with respect to a mode selection signal, wherein the switching varactor unit has at least a first diode and a second diode, the positive ends of the first diode and the second diode are commonly coupled to a node, and the node receives a frequency-selection voltage; and

coupling the switching varactor unit with the VCO core in parallel, so as to shift a frequency constant  $\sqrt{LC}$  of the VCO core.

Claim 9. (original) The method of claim 8, wherein the mode selection signal in the switching varactor unit is decoded and turns on corresponding varactor channels of the switching varactor unit, so as to change the capacitance.

Claim 10. (new) The VCO device of claim 1, further comprising a frequency selection unit for outputting the frequency-selection voltage, wherein the frequency selection unit comprises:

a control circuit, for receiving a input signal and a mode selection signal, outputting a control signal according to the mode selection signal;

a constant voltage generator, for generating a plurality of voltage levels; and

a selector switch, coupling to the control circuit and the constant voltage generator, for selecting one of the voltage levels to be served as the frequency-selection voltage according the

Application No.: 10/643,790

Docket No.: JCLA10858-R

control signal.

Claim 11. (new) The VCO device of claim 2, wherein each diode of diode pairs also coupled with a switching device controlled by the mode selection signal.

Claim 12. (new) The VCO device of claim 11, wherein the switching varactor unit further comprises a decoder to decode the mode selection signal into a plurality of channels with respect to the diode pairs for controlling the switching device, so whether each of diode pairs outputting their capacitance or not is controlled by the channels respectively.

Claim 13. (new) The FSK system of claim 3, wherein the frequency selection unit further comprises:

a control circuit, for receiving the input signal and the mode selection signal, outputting a control signal according to the mode selection signal;

a constant voltage generator, for generating a plurality of voltage levels; and

a selector switch, coupling to the control circuit and the constant voltage generator, for selecting one of the voltage levels to be served as the frequency-selection voltage according the control signal.